

**UNITED STATES DISTRICT COURT FOR THE  
WESTERN DISTRICT OF NORTH CAROLINA  
CHARLOTTE DIVISION  
3:07cv153-RJC-DCK**

<b>REMEDIATION PRODUCTS, INC.,</b>	)	
	)	
<b>Plaintiff,</b>	)	
	)	
<b>v.</b>	)	
	)	
<b>ADVENTUS AMERICAS, INC.,</b>	)	<b>ORDER</b>
<b>a Delaware Corporation, and</b>	)	
<b>ENVIROMETAL TECHNOLOGIES,</b>	)	
<b>INC., a Canadian Corporation,</b>	)	
	)	
<b>Defendants.</b>	)	
	)	

---

**THIS MATTER** is before the Court on the parties' cross motions for summary judgment regarding the '154 patent (Doc. Nos. 137 & 144). The matter is ripe for determination. For the reasons stated below, the Court will **GRANT** the plaintiff's motion and **DENY** the defendants' motion.

#### **I. BACKGROUND**

The events leading to this case occurred in early 2005. Defendants Adventus Americas, Inc. and Envirometal Technologies, Inc. ("ETI") (collectively "Adventus"), contacted plaintiff Remediation Products, Inc. ("RPI"), in regards to licensing under U.S. Patent No. 5,266,213 ("the '213 patent"), entitled "Cleaning Halogenated Contaminants from Groundwater," and U.S. Patent No. 5,534,154 ("the '154 patent"), entitled "System for Cleaning Contaminated Soil." Adventus indicated it intended to enforce its rights under these two patents but was amenable to reviewing any information indicating that RPI's technology was unrelated to these patents. In July of 2005, representatives of Adventus and RPI met to discuss the matter, but they failed to reach an agreement.

In short, Adventus insisted on licensing and payment of royalties by RPI, whereas RPI insisted that its BOS 100® product does not infringe the ‘213 and ‘154 patents. Although the parties thereafter continued to correspond in an effort to reach an agreement, they were unable to resolve their differences. This lawsuit ensued.

RPI filed this action on April 6, 2007, and sought a declaratory judgment that the ‘213 and ‘154 patents are not infringed and are invalid. Adventus counterclaimed for infringement of the ‘213 and ‘154 patents and also asserted infringement of four additional patents: U.S. Patents Nos. 6,083,394; 5,480,579; 5,411,664; and 5,618,427 (collectively, the “Grace Patents”). RPI filed its reply asserting counterclaims of noninfringement and invalidity of the Grace patents. On August 12, 2009, the Court granted RPI’s Motion to Amend its Complaint to include a claim that the ‘213 patent is unenforceable because of inequitable conduct. (Doc. No. 92). RPI filed this action in the United States District Court for the Western District of North Carolina because Adventus asserted the ‘213 and ‘154 patents against RPI and an RPI customer located in Charlotte, North Carolina. The Court denied Adventus’s motion to dismiss portions of RPI’s first amended complaint on March 18, 2010.

Both RPI and Adventus moved for summary judgment as to the ‘213 patent and the ‘154 patent. RPI also moved for summary judgment as to the Grace Patents. The Court granted in part and denied in part the summary judgment motions of both parties as to the ‘213 patent.<sup>1</sup> It now addresses the parties cross motions as to the ‘154 patent.

#### **A. RPI’s allegedly infringing product and method**

RPI produces and sells a product under the brand name BOS 100® that is used in cleaning

---

<sup>1</sup> The Court deferred ruling on RPI’s inequitable conduct and fraud claims until after the Federal Circuit completes its en banc review of the standard for such claims.

groundwater contaminated with halogenated hydrocarbons. BOS 100® is comprised of 90 to 95% carbon and 5 to 10% elemental iron. It is made by treating granular, activated carbon with an iron salt to impregnate the activated carbon with the iron salt. The material is then subjected to reducing conditions and heating to a very high temperature to convert the iron salt into elemental iron embedded within the activated carbon structure.

The recommended method of using BOS 100® requires mixing the product with water in an open tank to form a slurry. The open tank allows air and atmospheric oxygen into the tank. A portion of this atmospheric oxygen is dissolved into the slurry, and the activated carbon in turn adsorbs some portion of this dissolved oxygen. During this process, no attempts are made to prevent oxygen from entering the slurry or the groundwater below.

When the slurry is ready for use, holes roughly an inch in diameter are driven into the ground to a depth sufficient to reach the bottom of the contaminated plume of groundwater. The slurry is injected into the hole at specific depth intervals from the lowest level of contamination to the highest level. During each injection, the slurry radiates outwardly and horizontally from the injection point to form an irregular layer of BOS 100® based on the density and pathways of the aquifer. RPI contends each layer is vertically spaced roughly two feet from the vertically adjacent layers. Adventus contends such regular spacing does not occur. This process is then repeated at other injection points until the slurry has been injected in a grid pattern over the area of contamination to form what RPI contends is hundreds of individual, horizontal layers of BOS 100®. Adventus contends these layers overlap and come together to collectively make up a continuous wall of the product. Once the slurry is in place, the granular activated carbon adsorbs the chlorinated hydrocarbons out of the groundwater, and the impregnated elemental iron converts the chlorinated hydrocarbons into harmless compounds.

## **A. The ‘154 Patent**

Adventus has asserted independent Claims 1 and 15 and dependent Claims 3, 4, 8-14, and 17 of the ‘154 patent. Claim 1 recites six steps for cleaning a halogenated organic contaminant from groundwater in an aquifer:

1. Procedure for treating contaminated water, by passing the water containing contaminant in solution through a permeable body of treatment material comprising particles of an adsorptive material physically mixed with particles of a metal, wherein:

the nature of the contaminant and the nature of the metal are such that the contaminant breaks down by chemical reaction into chemically distinct and different substances when brought into, and during the course of, prolonged contact with the particles of metal;

the nature of the adsorptive material is such that the contaminant is adsorbed out of solution onto the particles of adsorptive material upon the contaminated water being passed over and through the permeable mixture;

the adsorptive capacity of the adsorptive material is such that the velocity of the contaminant passing through the permeable mixture is substantially more retarded than the velocity of the water passing through the permeable body;

whereby the contaminant, being retarded on and by the particles of adsorbent material, is held physically adjacent to the particles of metal for a substantially longer period of time than the passing water, and is so held long enough for chemical breakdown of the contaminant to take place;

and the procedure includes the step of so disposing and arranging the mixture that all oxidising agents and materials, including atmospheric oxygen, are excluded from contact with the mixture.

Independent Claim 15 of the ‘154 patent recites:

15. An apparatus for treating contaminated water, wherein:

at least one of the contaminants in the water is of the kind which breaks down by chemical reaction into chemically distinct and different substances when brought into, and during the course of, prolonged contact with particles of metal;

the apparatus includes a body of metal particles, and includes a means for directing the flow of contaminated water through the said body;

the apparatus includes a means for excluding oxidising agents and materials, including atmospheric oxygen, from the body of metal particles, and the means is effective to exclude the said agents and materials;

the apparatus includes a body of an adsorbent material, of the type which is capable of adsorbing the said at least one contaminant;

the body of metal particles and the body of adsorbent material are mixed together to form a mixture, the mixture being such that the mixture is permeable to the flow of water therethrough;

the mixture is positioned within a flowing stream of the contaminant-containing water;

the adsorptive capacity of the body of adsorptive material, and its disposition in the mixture, are such that the flow rate of the contaminant passing through the permeable mixture is substantially more retarded than the flow rate of the water passing through the permeable mixture;

whereby the contaminant, being retarded on and by the adsorbent material, is held physically adjacent to the particles of metal for a substantially longer period of time than the passing water, and is so held long enough for chemical breakdown of the contaminant to take place.

## **II. LEGAL STANDARD**

Summary judgment shall be granted “if the pleadings, depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a judgment as a matter of law.” Fed. R. Civ. P. 56(c). The movant has the “initial responsibility of informing the district court of the basis for its motion, and identifying those portions of ‘the pleadings, depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any,’ which it believes demonstrate the absence of a genuine issue of material fact.” Celotex Corp. v. Catrett, 477 U.S. 317, 323 (1986) (quoting Fed. R. Civ. P. 56(c)).

Once this initial burden is met, the burden shifts to the nonmoving party. The nonmoving party “must set forth specific facts showing that there is a genuine issue for trial.” Id. at 322 n.3. The nonmoving party may not rely upon mere allegations or denials of allegations in his pleadings

to defeat a motion for summary judgment. *Id.* at 324. The nonmoving party must present sufficient evidence from which “a reasonable jury could return a verdict for the nonmoving party.” *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248 (1986); accord *Sylvia Dev. Corp. v. Calvert County, Md.*, 48 F.3d 810, 818 (4th Cir. 1995).

When ruling on a summary judgment motion, a court must view the evidence and any inferences from the evidence in the light most favorable to the nonmoving party. *Anderson*, 477 U.S. at 255. “Where the Record taken as a whole could not lead a rational trier of fact to find for the nonmoving party, there is no genuine issue for trial.”” *Ricci v. DeStefano*, 129 S. Ct. 2658, 2677, 557 U.S. \_\_\_\_ (2009) (quoting *Matsushita v. Zenith Radio Corp.*, 475 U.S. 574, 587 (1986)).

### **III. DISCUSSION**

Adjudication of patent infringement requires a two-step process: (1) the court must construe the disputed claim terms to determine the scope and meaning of the claims alleged to be infringed; and (2) the court must apply the construed claims to the accused product and process. *Cybor Corp. v. FAS Technologies, Inc.*, 138 F.3d 1448, 1454 (Fed. Cir. 1998) (en banc). The court has already construed and clarified the disputed claim terms and phrases in its orders dated October 10, 2008 (Doc. No. 107); January 7, 2009 (Doc. No. 121); and August 7, 2009 (Doc. No. 187). The Court now determines whether the claims, as construed by the Court, embody the accused product and process.

#### **A. Standard for patent infringement**

In order to prove patent infringement, the patentee must “prove that the accused device embodies every limitation in the claim, either literally, or by a substantial equivalent.” *Zelinski v. Brunswick Corp.*, 185 F.3d 1311, 1316 (Fed. Cir. 1999). Literal infringement occurs when every limitation recited in the claim is found in the accused device so that the claims read on the device

exactly. Amhil Enterprises Ltd. v. Wawa, Inc., 81 F.3d 1554, 1562 (Fed. Cir. 1996).

Even where an accused product or process does not literally infringe, however, a patentee may still prove infringement under the doctrine of equivalents. Under the doctrine of equivalents, a product or process that does not literally infringe each element of a patent claim may still infringe if each and every limitation of the claim is literally or equivalently present in the accused product or process. Warner-Jenkinson Co., Inc. v. Hilton Davis Chemical Co., 520 U.S. 17, 40 (1997). The doctrine of equivalents is applied to individual claim limitations, rather than to an invention as a whole. K-2 Corp. v. Salomon S.A., 191 F.3d 1356, 1367 (Fed. Cir. 1999). Consequently, “the doctrine of equivalents cannot be used to vitiate an element from the claim in its entirety.” Id.

Depending on the facts of a case, courts apply one of two tests to determine equivalence. Warner-Jenkinson, 520 U.S. at 39-40 (noting regardless of the test applied, the central inquiry is whether “the accused product or process contain[s] elements identical or equivalent to each claimed element of the patented invention”). First, under the insubstantial differences test, “[a]n element in the accused device is equivalent to a claim limitation if the only differences between the two are insubstantial.” Voda v. Cordis Corp., 536 F.3d 1311, 1326 (Fed. Cir. 2008) (quoting Honeywell Int’l Inc. v. Hamilton Sundstrand Corp., 370 F.3d 1131, 1139 (Fed. Cir. 2004)). Alternatively, the function-way-result test defines equivalence as where “an element in the accused device . . . ‘performs substantially the same function in substantially the same way to obtain substantially the same result’” as the claim limitation. Id. (quoting Schoell v. Regal Marine Industries, Inc., 247 F.3d 1202, 1209-10 (Fed. Cir. 2001)).

“Summary judgment on the issue of infringement is proper when no reasonable jury could find that every limitation recited in a properly construed claim either is or is not found in the accused device either literally or under the doctrine of equivalents.” PC Connector Solutions LLC v.

SmartDisk Corp., 406 F.3d 1359, 1364 (Fed. Cir. 2005).

### **B. Claim 1**

The final limitation of Claim 1 states that “the procedure includes the step of so disposing and arranging the mixture that all oxidising agents and materials, including atmospheric oxygen, are excluded from contact with the mixture.” (Doc. No. 1-2 at 9). The Court has construed this limitation to mean “the mixture of particles is disposed and arranged such that all oxidizing agents, including atmospheric oxygen, are excluded from contact such that a portion of the mixture does not rust.” (Doc. No. 107 at 23). Adventus argues that the Court’s construction does not require that all oxygen be excluded from the mixture. It contends the Court instead “ruled that the claim requires that some portion of the mixture is excluded from oxygen such that it does not rust.” (Doc. No. 162 at 17).

Adventus’s reading of this construction is inaccurate. In construing this limitation, the Court clearly used the language “such that all oxidizing agents . . . are excluded.” A plain reading of this construction cannot be understood other than to require that all oxygen must be excluded from the mixture. The final portion of the Court’s construction, “such that a portion of the mixture does not rust,” merely states the result of excluding all oxidizing agents. It does not, as Adventus would have it, alter the meaning of the word “all” to mean something less, such as “enough” or “sufficient.” All means all. Because the record makes clear that BOS 100® contains levels of dissolved oxygen in its mixture, RPI does not infringe this limitation of Claim 1. There is no genuine issue for trial as to this issue.

Additionally, the Court finds that BOS 100® does not infringe this limitation under the doctrine of equivalents. The presence of oxygen in the BOS 100® mixture cannot be said to be an insubstantial difference from the ‘154 patent’s requirement that all oxygen be excluded from the

mixture. No reasonable jury could find as much.

In light of this holding, the Court will grant RPI’s motion and deny Adventus’s motion as to infringement of Claim 1 of the ‘154 patent. See PC Connector Solutions, 406 F.3d at 1364 (“Summary judgment on the issue of infringement is proper when no reasonable jury could find that every limitation recited in a properly construed claim . . . is . . . found in the accused device either literally or under the doctrine of equivalents.”). In addition, the Court will grant RPI’s motion and deny Adventus’s motion as to infringement of the claims dependent upon Claim 1: Claim 3, Claim 4, and Claims 8 through 14. See Monsanto Co. v. Syngenta Seeds, Inc., 503 F.3d 1352, 1359 (Fed. Cir. 2007) (“One who does not infringe an independent claim cannot infringe a claim dependent on (and thus containing all the limitations of) that claim.”).

### C. Claim 15

Claim 15 recites: “the apparatus includes a means for excluding oxidising agents and materials, including atmospheric oxygen, from the body of metal particles, and the means is effective to exclude the said agents and materials.” In construing this element, the Court has recognized that the limitation of “a means for excluding oxidising agents and materials” is a means-plus-function limitation under 35 U.S.C. § 112, ¶6. The Court construed the function of this means-plus-function limitation as “excluding oxidizing agents and material, including atmospheric oxygen, from the body of metal particles.” (Doc. No. 187 at 4). The Court construed the corresponding structure that performs the function of this means-plus-function limitation as “a covering of inert materials or an airtight vessel for excluding agents or equivalent structures.” (Doc. No. 187 at 4). “To determine whether a claim limitation is met literally, where expressed as a means for performing a stated function, the court must compare the accused structure *with the disclosed structure*, and must find equivalent *structure* as well as *identity* of claimed function for that

structure.” Chiuminatta Concrete Concepts, Inc. v. Cardinal Indus., Inc., 145 F.3d, 1303, 1308 (Fed. Cir. 1998) (emphasis in original, citation omitted).

As to the corresponding structure that performs the function of this means-plus-function limitation, RPI concedes that “the injections of the BOS 100® by the direct push method result in the BOS 100® being covered by inert materials.” (Doc. No. 181 at 18).

RPI argues, however, that its application of BOS 100® is not identical in function, because it is not effective in “excluding oxidizing agents and material, including atmospheric oxygen, from the body of metal particles.” (Id.). It instead insists that even though BOS 100® may be placed below the water table, which is generally anaerobic, it is not effective to exclude oxidizing agents and materials because BOS 100® contains dissolved oxygen before and after being placed in the ground. Adventus counters with the argument that “[g]iven the chemistry involved, any oxygen in the slurry will be rapidly consumed by some iron (turning that small portion of iron into rust) once the material is placed in the subsurface.” (Doc. No. 162 at 24). However, while Adventus argues this position in its brief, it cites no record evidence confirming it. The Court cannot accept this argument as a fact refuting the undisputed evidence that some dissolved oxygen is present in a slurry of BOS 100®.<sup>2</sup> Thus for purposes of this motion, the Court accepts the unrefuted evidence that some oxygen is present in a typical slurry of BOS 100®.

RPI maintains that the presence of dissolved oxygen in a BOS 100® slurry places

---

<sup>2</sup> Adventus does cite RPI’s expert testimony stating that some interstices of BOS 100® will remain anaerobic. This admission, however, does not confirm in fact whether “any oxygen in the slurry will be rapidly consumed . . . once the material is placed in the subsurface,” as Adventus argues. This is especially true in light of record evidence provided by RPI, a third-party Injection Evaluation Report from one of its job sites, stating that high levels of dissolved oxygen were found in the groundwater where BOS 100® had been used. (Doc. No. 56-3 at 6) (“Dissolved oxygen concentrations were generally high both before and following injection, which is considered unfavorable for reductive dechlorination. However, the high dissolved oxygen does not appear to have significantly inhibited the dechlorination process.”).

BOS 100®, and RPI’s method of using it, beyond the scope of this limitation of Claim 15. This is because, RPI argues, if dissolved oxygen is present in a BOS 100® slurry, then RPI’s method is not effective to exclude oxidizing agents and material, which is the function of this means-plus-function limitation. Adventus points to a comment by RPI’s expert Widdowson, who stated that “the soil above the seams of BOS 100® serves to prevent contact with atmospheric oxygen.” This is an unsworn expert report that the Court need not consider for summary judgment purposes. See DG&G, Inc. v. FlexSol Packaging Corp., 576 F.3d 820, 826 (affirming district court’s consideration of such evidence because subsequently cured by affidavit); 11 Moore’s Federal Practice ¶ 56-14 (“Unsworn expert reports prepared in compliance with Rule 26(a)(2) do not qualify as affidavits or otherwise admissible evidence for purpose of Rule 56, and may be disregarded by the court when ruling on a motion for summary judgment.”). However, even if the Court were to consider the report, it speaks only to atmospheric oxygen, whereas the required function is to exclude “oxidizing agents and material, including atmospheric oxygen.” This language encompasses not only atmospheric oxygen, but also dissolved oxygen. Yet Widdowson’s statement says nothing of the presence of dissolved oxygen in a BOS 100® slurry.

As RPI points out, the only evidence of record regarding oxygen or oxidizing agents or materials from sites that have employed BOS 100® is from the site in Charlotte, North Carolina, known as the “Mitchell Site.” An Injection Evaluation Report of this site, prepared by state-hired consultants, states that after BOS 100® had been used at this site, “[d]issolved oxygen concentrations were generally high both before and following injection.” (Doc. No. 56-3 at 6). The report further notes that “the high dissolved oxygen does not appear to have significantly inhibited the dechlorination process.” (Id.). At this site, the oxygen levels at various points of injection of

the BOS 100® fluctuated, but they certainly did not steadily decrease.<sup>3</sup> (Id. at 9). Thus there is no evidence of record showing BOS 100® is effective in “excluding oxidizing agents and material, including atmospheric oxygen, from the body of metal particles.” As a consequence, no genuine issue of material fact exists whether BOS 100® functions to perform the identical function described in this means-plus-function limitation of Claim 15, and there is no literal infringement.

In addition, this lack of evidence as to BOS 100®’s ability to exclude oxygen fails to raise a genuine issue of fact from which a reasonable jury could find that BOS 100® differs only insubstantially from the function of this limitation. Excluding dissolved oxygen is indispensable to the function of the limitation at issue, and there are simply no facts demonstrating BOS 100® excludes dissolved oxygen. There is no genuine issue for trial as to infringement under the doctrine of equivalents.

The Court will grant RPI’s motion and deny Adventus’s motion as to infringement of Claim 15 of the ‘154 patent. See PC Connector Solutions, 406 F.3d at 1364 (“Summary judgment on the issue of infringement is proper when no reasonable jury could find that every limitation recited in a properly construed claim . . . is . . . found in the accused device either literally or under the doctrine of equivalents.”). In addition, the Court will grant RPI’s motion and deny Adventus’s motion as to infringement of claim 17, which is dependent upon Claim 15. See Monsanto, 503 F.3d at 1359 (“One who does not infringe an independent claim cannot infringe a claim dependent on (and thus containing all the limitations of) that claim.”).<sup>4</sup>

---

<sup>3</sup> In one of the wells where the report showed significant decreased contamination, the ORP level went from oxidizing to reducing, and then back to oxidizing, indicating an initial decrease in the oxygen level of the well and a subsequent increase in oxygen. See (Doc. No. 56-3 at 9) (ORP level data for well MW-8).

<sup>4</sup> The Court does not reach RPI’s alternative claims of invalidity in light of this ruling, as no “live controversy over validity remains” as to the ‘154 patent. See Med. Instr. & Diagnostics Corp. v. Elekta AB, 344 F.3d 1205, 1222 n.1 (Fed. Cir. 2003).

#### **IV. CONCLUSION**

**IT IS, THEREFORE, ORDERED** that:

1. Adventus's motion for partial summary judgment regarding the '154 patent (Doc. No. 144) is **DENIED**;
2. RPI's motion for partial summary judgment regarding the '154 patent (Doc. No. 137) is **GRANTED**;
3. The Court **DECLARES** that BOS 100® and RPI's method of using it does not infringe the '154 patent either literally or under the doctrine of equivalents; and
4. Adventus's Second Claim for Relief is hereby **DISMISSED**.

Signed: September 27, 2010

  
\_\_\_\_\_  
Robert J. Conrad, Jr.  
Chief United States District Judge  
